

SECTION V. MAINTENANCE

11.5.1 INTRODUCTION

This section provides preventive and corrective maintenance procedures for the freezing rain sensor. Preventive maintenance consists of sensor inspection and cleaning (if necessary). Corrective maintenance consists of fault isolation using the ASOS freezing rain page and removing and replacing the sensor.

11.5.2 PREVENTIVE MAINTENANCE

The freezing rain sensor is inspected and the probe is cleaned if necessary every 90 days. Table 11.5.1 provides the procedure for sensor inspection and cleaning. The probe is cleaned only when it is contaminated with foreign material such as dirt, oil, fingerprints, etc. If environmental conditions are acceptable, the output frequency of the sensor is checked. If the output frequency is out of tolerance, the sensor must be replaced. Every six months, the model 0872C2 ground path conductivity must be measured as described in paragraph 11.5.2.1.

11.5.2.1 **Model 0872C2 Ground Fault Check**. Verify the freezing rain sensor ground path as follows:

- a. At equipment cabinet, set freezing rain sensor circuit breaker to off (right) position.
- b. At model 0872C2 freezing rain sensor, check internal chassis ground inside freezing rain enclosure by verifying J1-3 (green wire) is tight.
- c. Second ground is electronics enclosure (case) ground and is 10 American Wire Gauge (AWG) ground wire connected to single barrel lug on electronics enclosure (case). Check ground wire connection at raceway ground wire. Check for corrosion on both lugs. If corrosion is detected, clean by using a wire brush.
- d. Third ground is mounting pole connected to pedestal and provides earth ground. Check that all bolts and nuts are installed and tight.
- e. After the ground connections are checked and verified, set the freezing rain circuit breaker in the DCP to the ON position.

CAUTION

Do not touch sensor case until voltage check has been completed in step h.

- g. At the OID, go to the REVUE-SITE-CONFIG-SENSR page. Configure the freezing rain sensor in the appropriate position.
- h. Using a DVM, check the AC and DC voltages between the case of the freezing rain enclosure and the 10 AWG copper wire located at the raceway. If the voltage measures more than 0.25 volts AC or DC, remove power from the freezing rain sensor by turning OFF the circuit breaker in the DCP. Call Bobby McCormick at 301-713-1835 X 120 and report the problem.

11.5.3 CORRECTIVE MAINTENANCE

Freezing rain sensor corrective maintenance consists of troubleshooting failures and sensor removal and replacement. In order to communicate with the sensor for calibration (and troubleshooting), the maintenance technician must connect a laptop computer to the sensor.

11.5.3.1 Using the Laptop Computer With the Freezing Rain Sensor. In order to communicate with the sensor for calibration and other tasks, the maintenance technician must use the laptop computer. Table 11.5.2 provides the procedure to set up the laptop computer to communicate with the sensor. Paragraph 11.4.3 provides detailed descriptions of individual sensor commands.

11.5.3.2 Troubleshooting. The FREEZING RAIN maintenance page at the OID is the primary troubleshooting tool for the freezing rain sensor. Although diagnostic commands can be issued directly from the laptop computer, these commands provide no additional information other than what is displayed on the OID. Table 11.5.3 provides a summary of troubleshooting actions for different failure indications. Table 11.5.4 provides additional troubleshooting steps for heater failures. The heater checks should be performed only after a heater failure is indicated on the freezing rain page (or by a Z1 or Z3 command) or if a "no response" condition occurs after a Z3 command is issued. Remove and replace the electronics enclosure when fault isolation identifies the sensor as the source of the failure.

11.5.3.3 Calibration. The sensor is calibrated at the authorized repair facility by using the laptop computer to issue an F5 command (paragraph 11.4.3.6). **Sensor field calibration is not authorized.** The freezing rain sensor should be calibrated only when sensor F1 frequency is less than 39,990 hertz or greater than 40,010 hertz. Calibration may be performed only when the probe assembly is clean and dry and when environmental conditions are acceptable. Calibration should not be performed under any of the following conditions:

- a. When ice, snow, or liquid water is visible on the probe or at the base of the probe or when the probe is dirty. These substances cause the frequency of the probe to deteriorate.
- b. When ambient temperature is below -10°C (14°F) or above +10°C (50°F). Temperatures outside this range cause contraction or expansion of the metallic probe, thereby modifying its frequency.
- c. Within 20 minutes of a Z3 request. A Z3 request initiates a device cycle and the probe needs time to return to ambient temperature.
- d. When a fail condition is indicated on the freezing rain sensor page on the OID (or by Z1 or Z4 commands). The sensor cannot be calibrated in a failed condition or when responding to data requests or when performing self-diagnostics.
- e. More than once every 90 days. More frequent calibration under normal operating conditions is unnecessary.

Table 11.5.5 provides the procedure to calibrate the freezing rain sensor.

11.5.4 FRU REMOVAL AND INSTALLATION

Removal and installation procedures identified on the following chart by table number are provided to facilitate safe and efficient removal of sensor FRU's.

<u>Unit to be replaced</u>	<u>Table</u>
Electronics enclosure	11.5.6 (field level)
Electronics Processor board	11.5.7 (depot level)
Probe assembly	11.5.8 (depot level)
Fiberoptic module	11.5.9 (depot level)

Table 11.5.1. Freezing Rain Sensor Inspection and Cleaning

Step	Procedure
	<p>Tools and Materials Required:</p> <ul style="list-style-type: none"> Soft cotton cloth Isopropyl alcohol (ASN 052-C-12) Laptop computer with PROCOMM Plus installed Laptop interface (Y-shaped) cable Large flat-tipped screwdriver No. 1 Phillips screwdriver <p style="text-align: center;"><u>WARNING</u></p> <p>Death or severe injury may result if power is not removed from sensor prior to maintenance activities. Ensure that circuit breakers (located inside DCP equipment cabinet) supplying power to sensor are set to off (right) position.</p>
1	Set circuit breakers on freezing rain sensor circuit breaker module inside DCP equipment cabinet to off (right) position. The freezing rain sensor circuit breaker module is labeled.
	<p style="text-align: center;"><u>WARNING</u></p> <p>Freezing rain sensor probe assembly will be hot if sensor recently completed a deice cycle. Ensure that probe assembly has cooled before cleaning probe.</p>
2	At freezing rain sensor, inspect surface of probe for contaminants such as dirt, oil, fingerprints, etc. If any contaminants are present, clean probe using isopropyl alcohol and soft cotton cloth.
3	Set circuit breakers on freezing rain sensor circuit breaker module inside DCP equipment cabinet to on (left) position.
4	Check sensor frequency using either REVUE-SENSOR-12HR page of OID or laptop computer (Z1 command).
	<p style="text-align: center;">NOTE</p> <p>If temperature is out of range, frequency tolerance (± 10 hertz) may not be applicable. Do not perform calibration when temperature is out of range.</p>
5	If ambient temperature is $0^{\circ}\text{C} \pm 10^{\circ}\text{C}$, verify that frequency is $40,000 \pm 10$ hertz. If frequency is out of tolerance, remove and replace the electronics enclosure.

Table 11.5.2. Using the Laptop Computer With the Freezing Rain Sensor

Step	Procedure
INITIAL SETUP PROCEDURE	
	<p>Tools Required:</p> <ul style="list-style-type: none"> Laptop computer with PROCOMM Plus installed Laptop interface (Y-shaped) cable Laptop null cable Large flat-tipped screwdriver No. 1 Phillips screwdriver
1	Set circuit breakers on freezing rain sensor circuit breaker module inside DCP equipment cabinet to off (right) position.

Table 11.5.2. Using the Laptop Computer With the Freezing Rain Sensor -CONT

Step	Procedure
	<p style="text-align: center;"><u>WARNING</u></p> <p>Probe Assembly A1A1 will be hot if sensor recently completed a device cycle. Ensure that probe assembly has cooled before proceeding to step 2.</p>
2	Using flat-tipped screwdriver, loosen four captive bolts securing hinged sensor access door and open door.
3	Using No. 1 Phillips screwdriver, disconnect DB-9 connector from fiberoptic module inside electronics enclosure.
4	Using laptop computer null cable and interface (Y-shaped) cable, connect RS-232C (COM1) port of laptop computer to DB-9 connector removed from fiberoptic module.
5	Turn on laptop computer and initialize PROCOMM Plus program. After program initializes, press any key to enter terminal mode (blank) screen.
6	<p>Using ALT-S command (setup facility), set up the following terminal options:</p> <ul style="list-style-type: none"> a. Terminal emulation: VT220 b. Duplex: FULL c. Soft flow control (XON/XOFF): OFF d. Hard flow control (CTS/RTS): OFF e. Line wrap: OFF f. Screen scroll: ON g. CR translation: CR h. BS translation: NON-DESTRUCTIVE i. Break length (milliseconds): 035 j. Enquiry: OFF k. EGA/VGA true underline: OFF l. Terminal width: 80 m. ANSI 7 or 8 bit commands: 8 BIT
7	Press ESC key to exit to terminal mode (blank) screen.
8	<p>Using ALT-P command (line/port option), set current settings as follows:</p> <ul style="list-style-type: none"> a. Baud rate: 2400 or 9600 (depending on modem used) b. Parity: NONE c. Data bits: 8 d. Stop bits: 1 e. Port: COM1
9	Press ESC key to exit to terminal mode (blank) screen
10	Set laptop computer CAPS LOCK to ON.
11	Set circuit breakers on freezing rain sensor circuit breaker module inside DCP equipment cabinet to on (left) position
	<p style="text-align: center;">NOTE</p> <p>After a power interruption, the freezing rain sensor takes 30 seconds to initialize and an additional 15 seconds to calculate an averaged frequency. If a Z1 command is issued within 30 seconds of power-on, the sensor will not respond. If the sensor fails to respond to any Z command, allow an additional 30 seconds and reissue the command.</p>
12	The freezing rain sensor is now available for legal commands from the laptop computer. Refer to paragraph 11.4.3 for detailed descriptions of sensor commands and for specific restrictions on their use.

Table 11.5.2. Using the Laptop Computer With the Freezing Rain Sensor -CONT

Step	Procedure
TEARDOWN	
1	At laptop computer, press ALT-X (exit) to exit PROCOMM Plus.
2	Turn off laptop computer.
3	Set circuit breakers on freezing rain sensor circuit breaker module inside DCP equipment cabinet to off (right) position.
4	Disconnect cables between laptop computer and freezing rain sensor.
5	Using No. 1 Phillips screwdriver, connect freezing rain sensor DB-9 connector to fiberoptic module.
6	Using large flat-tipped screwdriver, close and secure freezing rain sensor access door.
7	Set circuit breakers on freezing rain sensor circuit breaker module inside DCP equipment cabinet to on (left) position.

Table 11.5.3. Freezing Rain Sensor Troubleshooting

Symptom	What to Do
Sensor does not respond. (Field Level)	Connect laptop computer and issue Z1 command. If sensor responds, perform fiberoptic module test (Chapter 1, Section V). If sensor fails to respond, replace sensor (Electronics Processor Board A1A2 failure).
PROBE STATUS failure (Depot Level)	Replace Probe Assembly A1A1. If failure continues, replace Electronics Processor Board A1A2.
ELECTRONICS STATUS failure (Depot Level)	Replace Electronics Processor Board A1A2.
HEATER STATUS failure (Depot Level)	Perform heater resistance test (table 11.5.4). If resistance is out of tolerance, replace Probe Assembly A1A1. If resistance is within tolerance, replace Electronics Processor Board A1A2.

Table 11.5.4. Depot Level Probe Assembly Heater Troubleshooting

Step	Procedure
	<p>Tools and Materials Required:</p> <p>Large flat-tipped screwdriver</p> <p>Tweezers</p> <p>Digital multimeter</p> <p style="text-align: center;"><u>WARNING</u></p> <p>Death or severe injury may result if power is not removed from sensor prior to maintenance activities. Ensure that circuit breakers (located in DCP) supplying power to sensor are set to off (right) position.</p>
1	At equipment cabinet, set freezing rain sensor circuit breaker module to off (right) position.
	<p style="text-align: center;"><u>WARNING</u></p> <p>Probe Assembly A1A1 will be hot if sensor recently completed a deice cycle. Ensure that probe assembly has cooled before proceeding to step 2.</p>
2	Using flat-tipped screwdriver, loosen four captive bolts securing hinged cover to sensor and open cover.

Table 11.5.4. Depot Level Probe Assembly Heater Troubleshooting -CONT

Step	Procedure
	<p style="text-align: center;"><u>CAUTION</u></p> <p>Use caution when removing probe connectors. Heater on Electronics processor board may be damaged if too much side pressure is exerted.</p>
3	Using tweezers, disconnect probe assembly electrical connectors J3 and J4 from electronics processor board. (Refer to figure 11.1.2). To disconnect connector J4, press latch and pull connector straight out.
4	Using digital multimeter, measure resistance between pins 1 and 2 of connector J4. Verify that resistance is 42 ± 5 ohms. If resistance is out of tolerance, replace Probe Assembly A1A1. If resistance is within tolerance, replace Electronics Processor Board A1A2.

Table 11.5.5. Depot Level Freezing Rain Sensor Calibration

Step	Procedure
	<p>Tools and Materials Required:</p> <ul style="list-style-type: none"> Laptop computer with PROCOMM Plus installed Laptop interface (Y-shaped) cable Laptop null cable Large flat-tipped screwdriver No. 1 Phillips screwdriver <p style="text-align: center;"><u>CAUTION</u></p> <p>Probe must be clean and dry and environmental conditions must be acceptable (paragraph 11.5.3.3). Sensor calibration under less than optimum conditions may result in inaccurate sensor operation.</p>
1	Connect and initialize laptop computer for communication to freezing rain sensor in accordance with table 11.5.2.
2	At laptop computer, type Z4 <CR>. Verify that sensor responds with "ZP HH". If failure (F) is indicated, troubleshoot and repair sensor (based on indicated error code) before performing calibration.
3	Type F5 <CR>. Sensor responds with "ZPXXXXXX" where "XXXXXX" is the calibration frequency between 39,990 and 40,010 hertz.
4	Wait a minimum of 3 minutes, then type Z1 <CR>. Sensor responds with "ZP XXXXXHH". If failure (F) is indicated, troubleshoot and repair sensor (based on indicated error code) before performing calibration.
5	<p>Verify that frequency ("XXXXXX") is $40,000 \pm 10$ hertz. If frequency is out of tolerance, replace the following FRU's in order and recalibrate until the required tolerance is met. Allow at least 1 hour for probe to obtain ambient temperature when replacing probe or sensor.</p> <ul style="list-style-type: none"> a. Probe Assembly A1A1 b. Electronics Processor Board A1A2 c. Freezing rain sensor
6	Disconnect laptop computer and return sensor to operation in accordance with table 11.5.2.

Table 11.5.6. Electronics Enclosure Removal and Installation

Step	Procedure
REMOVAL	
<p>Tools and Materials Required:</p> <p>Flat-tipped screwdriver</p> <p>7/16-inch wrench</p> <p>Large pliers (12 inch, 2-1/4 inch capacity, curved jaw)</p> <p>3/16-inch hex key wrench</p> <p style="text-align: center;"><u>WARNING</u></p> <p>Death or severe injury may result if power is not removed from sensor prior to maintenance activities. Ensure that circuit breakers (located in DCP) supplying power to sensor are set to off (right) position.</p> <p style="text-align: center;">NOTE</p> <p>Electronics enclosure replacement should be accomplished only when environmental conditions are as specified for field calibration; otherwise, the unit cannot be field-calibrated immediately after replacement.</p>	
1	Set circuit breakers on freezing rain sensor circuit breaker module inside DCP equipment cabinet to off (right) position.
<p style="text-align: center;"><u>WARNING</u></p> <p>Probe Assembly A1A1 will be hot if sensor recently completed a deice cycle. Ensure that probe assembly has cooled before proceeding to step 2.</p>	
2	Place plastic probe cap protective cover over probe assembly.
3	<p>Using flat-tipped screwdriver, loosen four captive bolts securing hinged sensor access door and open door.</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>Electronics Processor Board A1A2 is a Class I ESD component. To avoid damage to electronics processor board, use proper ESD handling procedures, including the use of a ground strap, when performing the following steps.</p>
4	Remove two fiberoptic cables from underneath fiberoptic module by turning counterclockwise (ccw). Install protective plastic covers over fiberoptic connectors.
5	Using small flat-tipped screwdriver, release catches holding plastic cover over ac terminal board connector J1. Remove plastic cover.
6	Using flat-tipped screwdriver, remove five ASOS power and chassis ground wires from terminal board connector J1. Do not disconnect sensor chassis ground wire from terminal No. 3. After removing ASOS wires and fiberoptic cables, reinstall terminal screws.
7	Install protective plastic cover over ac terminal board connector J1.
8	Using 7/16-inch wrench, remove pedestal ground wire from ground stud located at bottom right of enclosure.
9	Using large pliers, remove flexible conduit from base of electronics enclosure. Carefully pull wires and fiberoptic cables out of enclosure.
10	Using large flat-tipped screwdriver, close and secure freezing rain sensor access door.
11	While supporting electronics enclosure and using 3/8-inch hex key wrench, loosen three captive screws on mounting pole behind enclosure. When enclosure is free from screws, carefully lift enclosure off mounting pole.

Table 11.5.6. Electronics Enclosure Removal and Installation -CONT

Step	Procedure																		
INSTALLATION																			
Tools and Materials Required: Flat-tipped screwdriver 7/16-inch wrench and torque driver Large pliers 3/8-inch hex key wrench and torque driver																			
<div>WARNING</div>																			
Death or severe injury may result if power is not removed from sensor prior to maintenance activities. Ensure that circuit breakers (located in DCP) supplying power to sensor are set to off (right) position.																			
<div>NOTE</div>																			
Electronics enclosure replacement should be accomplished only when environmental conditions are as specified for field calibration (refer to paragraph 11.4.3.6); otherwise, the unit cannot be field-calibrated immediately after replacement.																			
1	Ensure that circuit breakers on freezing rain sensor circuit breaker module inside DCP equipment cabinet are set to off (right) position. Circuit breaker module will be labeled.																		
2	Ensure that protective tube is installed over Probe Assembly A1A1 of replacement enclosure.																		
3	Position electronics enclosure on mounting pole.																		
4	While supporting electronics enclosure and using 3/8-inch hex key wrench, secure enclosure to pole by tightening three captive bolts. Using torque driver, torque bolts to 45 inch-pounds.																		
5	Using flat-tipped screwdriver, loosen four captive bolts securing hinged sensor access door and open door.																		
6	Route ac power wiring and fiberoptic cables through access hole in bottom of electronics enclosure.																		
7	Using large pliers and hardware supplied, connect flexible conduit to electronics enclosure.																		
8	Using 7/16-inch wrench, remove sensor-supplied nut from ground stud located at bottom right of enclosure. (Refer to figure 11.1.2.) Use nut to connect sensor pedestal 10 AWG ground wire to ground stud. Do not torque nut more than 7 foot-pounds.																		
<div>CAUTION</div>																			
Electronics Processor Board A1A2 is a Class I ESD component. To avoid damage to electronics processor board, use proper ESD handling procedures, including the use of a ground strap, when performing the following steps.																			
9	Using small flat-tipped screwdriver, release catches holding plastic cover over ac terminal board connector J1. Remove plastic cover.																		
10	On model 0872C3 only, using 11/32 inch wrench, connect green wire (chassis ground) to E1.																		
11	Using flat-tipped screwdriver, connect ac power wiring to ac terminal board connector J1 as follows: <table><tr><td>Wire color</td><td>Terminal</td><td>Function</td></tr><tr><td>Black</td><td>J1-1</td><td>115 vac (electronics)</td></tr><tr><td>White</td><td>J1-2</td><td>Neutral (electronics)</td></tr><tr><td>Green</td><td>J1-3</td><td>Chassis ground (model 0872C2 only)</td></tr><tr><td>Red</td><td>J1-4</td><td>115 vac (heater)</td></tr><tr><td>Yellow</td><td>J1-5</td><td>Neutral (heater)</td></tr></table>	Wire color	Terminal	Function	Black	J1-1	115 vac (electronics)	White	J1-2	Neutral (electronics)	Green	J1-3	Chassis ground (model 0872C2 only)	Red	J1-4	115 vac (heater)	Yellow	J1-5	Neutral (heater)
Wire color	Terminal	Function																	
Black	J1-1	115 vac (electronics)																	
White	J1-2	Neutral (electronics)																	
Green	J1-3	Chassis ground (model 0872C2 only)																	
Red	J1-4	115 vac (heater)																	
Yellow	J1-5	Neutral (heater)																	
12	Install protective plastic cover over ac terminal board connector J1.																		

Table 11.5.6. Electronics Enclosure Removal and Installation -CONT

Step	Procedure
13	Remove plastic covers from fiberoptic cables and connect transmit (TX) cable to TRANSMIT connector of fiberoptic module and receive (RX) cable to RECEIVE connector.
14	Remove protective cover from probe assembly.
15	Check sensor frequency using either OID REVUE-SENSOR-12HR page or laptop computer (Z1 command). If ambient temperature is $0^{\circ}\text{C} \pm 10^{\circ}\text{C}$, verify that frequency is $40,000 \pm 10$ hertz.

Table 11.5.7. Depot Level Electronics Processor Board Removal and Installation

Step	Procedure
<p style="text-align: center;">REMOVAL</p> <p style="text-align: center;">Tools and Materials Required: Flat-tipped screwdriver Small flat-tipped screwdriver No. 3 Phillips screwdriver Tweezers</p> <p style="text-align: center;"><u>WARNING</u></p> <p>Death or severe injury may result if power is not removed from sensor prior to maintenance activities. Ensure that circuit breakers (located in DCP) supplying power to sensor are set to off (right) position.</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>Processor board is a Class I ESD component. To avoid damage to circuit boards, use proper ESD handling procedures, including the use of a ground strap, when performing the following steps.</p> <p style="text-align: center;"><u>NOTE</u></p> <p>Electronics processor board replacement should be accomplished only when environmental conditions are as specified for field calibration; otherwise, the unit cannot be field-calibrated immediately after replacement.</p>	
1	Set circuit breakers on freezing rain sensor circuit breaker module inside DCP equipment cabinet to off (right) position. Circuit breaker module will be labeled.
<p style="text-align: center;"><u>WARNING</u></p> <p>Probe Assembly A1A1 will be hot if sensor recently completed a deice cycle. Ensure that probe assembly has cooled before proceeding to step 2.</p>	
2	Using flat-tipped screwdriver, loosen four captive bolts securing cover sensor and open cover. Cover is hinged to enclosure.
<p style="text-align: center;"><u>CAUTION</u></p> <p>Electronics Processor Board A1A2 is a Class I ESD component. To avoid damage to electronics processor board, use proper ESD handling procedures, including the use of a ground strap, when performing the following steps.</p>	
3	Remove two fiberoptic cables from underneath fiberoptic module by turning ccw. Install protective plastic covers over fiberoptic connectors.
4	Using small flat-tipped screwdriver, release catches holding plastic cover over ac terminal board connector J1. Remove plastic cover.

Table 11.5.7. Depot Level Electronics Processor Board Removal and Installation - CONT

Step	Procedure
5	Using flat-tipped screwdriver, remove five power and chassis ground wires from terminal board connector J1.
	<p style="text-align: center;">CAUTION</p> <p>Use caution when removing probe connectors. Heater on electronics processor board may be damaged if too much side pressure is exerted.</p>
6	Disconnect probe assembly electrical connectors from electronics processor board connectors J3 and J4. Use tweezers to press latch and pull connector straight out.
	<p style="text-align: center;">CAUTION</p> <p>Use caution when removing capacitor connectors. Heater on electronics processor board may be damaged if too much side pressure is exerted.</p> <p style="text-align: center;">NOTE</p> <p>Capacitors C7 and C9 are matched to Probe Assembly A1A1 and should be retained to use on the replacement electronics processor board.</p>
7	Disconnect and tag select capacitors C7 and C9 of Electronics processor board. Use tweezers to press latch and pull connector with capacitor mounted straight out.
8	Using No. 3 Phillips screwdriver, remove four screws securing Electronics Processor Board A1A2 to electronics enclosure.
INSTALLATION	
<p style="text-align: center;">Tools and Materials Required: Flat-tipped screwdriver Small flat-tipped screwdriver No. 3 Phillips screwdriver Tweezers</p> <p style="text-align: center;">WARNING</p> <p>Death or severe injury may result if power is not removed from sensor prior to maintenance activities. Ensure that circuit breakers (located in DCP) supplying power to sensor are set to off (right) position.</p> <p style="text-align: center;">CAUTION</p> <p>Processor board is a Class I ESD component. To avoid damage to circuit boards, use proper ESD handling procedures, including the use of a ground strap, when performing the following steps.</p> <p style="text-align: center;">NOTE</p> <p>Electronics processor board replacement should be accomplished only when environmental conditions are as specified for field calibration; otherwise, the unit cannot be field-calibrated immediately after replacement.</p>	
1	Ensure that circuit breakers on freezing rain sensor circuit breaker module inside DCP equipment cabinet are set to off (right) position.
2	Position Electronics Processor Board A1A2 in electronics enclosure so that terminal board connector J1 is toward bottom and screw holes in board align with holes in enclosure.
3	Using No. 3 Phillips screwdriver, install four screws securing Electronics processor board to electronics enclosure.
	<p style="text-align: center;">NOTE</p> <p>Select capacitors C7 and C9 should be retained from previously removed board.</p>
4	Using tweezers and tags as a guide, install select capacitors C7 and C9 onto Electronics Processor board.

Table 11.5.7. Depot Level Electronics Processor Board Removal and Installation - CONT

Step	Procedure																		
5	Using tweezers, install probe assembly electrical connectors onto Electronics Processor board connectors J3 and J4.																		
6	On model 0872C3 only, using 11/32 inch wrench, connect green wire (chassis ground) to E1.																		
7	Using flat-tipped screwdriver, connect ac power wiring to ac terminal board connector J1 as follows: <table><tr><td><u>Wire color</u></td><td><u>Terminal</u></td><td><u>Function</u></td></tr><tr><td>Black</td><td>J1-1</td><td>115 vac (electronics)</td></tr><tr><td>White</td><td>J1-2</td><td>Neutral (electronics)</td></tr><tr><td>Green</td><td>J1-3</td><td>Chassis ground (model 0872C2 only)</td></tr><tr><td>Red</td><td>J1-4</td><td>115 vac (heater)</td></tr><tr><td>Yellow</td><td>J1-5</td><td>Neutral (heater)</td></tr></table>	<u>Wire color</u>	<u>Terminal</u>	<u>Function</u>	Black	J1-1	115 vac (electronics)	White	J1-2	Neutral (electronics)	Green	J1-3	Chassis ground (model 0872C2 only)	Red	J1-4	115 vac (heater)	Yellow	J1-5	Neutral (heater)
<u>Wire color</u>	<u>Terminal</u>	<u>Function</u>																	
Black	J1-1	115 vac (electronics)																	
White	J1-2	Neutral (electronics)																	
Green	J1-3	Chassis ground (model 0872C2 only)																	
Red	J1-4	115 vac (heater)																	
Yellow	J1-5	Neutral (heater)																	
8	Install protective plastic cover over ac terminal board connector J1.																		
9	Remove protective plastic covers from fiberoptic cables. Connect transmit (TX) cable to TRANSMIT connector of fiberoptic module and receive (RX) cable to RECEIVE connector.																		
10	Calibrate freezing rain sensor in accordance with table 11.5.5.																		

Table 11.5.8. Depot Level Probe Assembly Removal and Installation

Step	Procedure
REMOVAL	
Tools and Materials Required: Flat-tipped screwdriver No. 1 Phillips screwdriver Tweezers	
<u>WARNING</u>	
Death or severe injury may result if power is not removed from sensor prior to maintenance activities. Ensure that circuit breakers (located in DCP) supplying power to sensor are set to off (right) position.	
NOTE	
Probe assembly replacement should be accomplished only when environmental conditions are as specified for field calibration; otherwise, the unit cannot be field-calibrated immediately after replacement.	
1	Set circuit breakers on freezing rain sensor circuit breaker module inside DCP equipment cabinet to off (right) position.
<u>WARNING</u>	
Probe Assembly A1A1 will be hot if sensor recently completed a deice cycle. Ensure that probe assembly has cooled before proceeding with step 2.	
2	Place protective cover over probe assembly.
3	Using flat-tipped screwdriver, loosen four captive bolts securing cover to sensor and open cover. Cover is hinged to enclosure.

Table 11.5.8. Depot Level Probe Assembly Removal and Installation - CONT

Step	Procedure
4	<p style="text-align: center;"><u>CAUTION</u></p> <p>Use caution when removing probe connectors. Heater on electronics processor board may be damaged if too much side pressure is exerted.</p>
	Using tweezers, disconnect probe assembly electrical connectors from electronics processor board connectors J3 and J4. For connector J4, press latch and pull connector straight out.
5	<p style="text-align: center;"><u>CAUTION</u></p> <p>Probe assembly cables and connectors are fragile. Remove cables and connectors slowly so that cables do not catch as they are guided through the housing or heat sink.</p>
	<p style="text-align: center;"><u>NOTE</u></p> <p>An O-ring that is used between the probe assembly and heat sink may come out when probe assembly is removed. Retain O-ring for installation of replacement probe assembly.</p>
6	<p style="text-align: center;"><u>CAUTION</u></p> <p>Use caution when removing capacitor connectors. Heater on electronics processor board may be damaged if too much side pressure is exerted.</p>
	<p style="text-align: center;"><u>NOTE</u></p> <p>Select capacitors C7 and C9 are a matched set and are packed and shipped with replaced probe assembly. New capacitors should be obtained from probe replacement kit.</p>
6	Disconnect and tag select capacitors C7 and C9 from electronics processor board. Use tweezers to press latch and pull connector with capacitor mounted straight out.
<u>INSTALLATION</u>	
<p style="text-align: center;">Tools and Materials Required:</p> <p style="text-align: center;">Flat-tipped screwdriver No. 1 Phillips screwdriver Tweezers</p> <p style="text-align: center;"><u>WARNING</u></p> <p>Death or severe injury may result if power is not removed from sensor prior to maintenance activities. Ensure that circuit breakers (located in DCP) supplying power to sensor are set to off (right) position.</p> <p style="text-align: center;"><u>NOTE</u></p> <p>Probe assembly replacement should be accomplished only when environmental conditions are as specified for field calibration; otherwise, the unit cannot be field-calibrated immediately after replacement.</p>	
1	Ensure that circuit breakers on freezing rain sensor circuit breaker module inside DCP equipment cabinet are set to off (right) position.
2	<p style="text-align: center;"><u>NOTE</u></p> <p>Replacement capacitors C7 and C9 are provided with replacement probe assembly.</p>
	Obtain probe assembly field replaceable kit (P/N 00872-0277). Ensure that kit contains replacement capacitors C7 and C9 and that protective cover is installed over probe assembly.

Table 11.5.8. Depot Level Probe Assembly Removal and Installation - CONT

Step	Procedure
	<p style="text-align: center;"><u>CAUTION</u></p> <p>Electronics Processor Board A1A2 is a Class I ESD component. To avoid damage to electronics processor board, use proper ESD handling procedures, including the use of a ground strap, when performing the following steps.</p>
3	Using tweezers, install replacement select capacitors C7 and C9 onto electronics processor board.
4	Place O-ring into channel on top of heat sink.
	<p style="text-align: center;"><u>CAUTION</u></p> <p>Probe assembly cables and connectors are fragile. Use caution so that cables do not catch as they are guided through the heat sink or housing.</p>
5	While holding probe assembly with one hand, carefully guide two cables through hole in heat sink and into electronics enclosure.
6	Using No. 1 Phillips screwdriver, install four screws securing probe assembly to heat sink.
7	Using tweezers, install probe assembly electrical connectors onto electronics processor board connectors J3 and J4.
8	Remove protective cover from probe assembly.
9	Calibrate freezing rain sensor in accordance with table 11.5.5.

Table 11.5.9. Fiberoptic Module Removal and Installation

Step	Procedure
	REMOVAL
	<p>Tools and Materials Required:</p> <ul style="list-style-type: none"> Flat-tipped screwdriver Small flat-tipped screwdriver No. 1 Phillips screwdriver
	<u>WARNING</u>
	Death or severe injury may result if power is not removed from sensor prior to maintenance activities. Ensure that circuit breakers (located in DCP) supplying power to sensor are set to off (right) position.
1	Set circuit breakers on freezing rain sensor circuit breaker module inside DCP equipment cabinet to off (right) position.
2	Using flat-tipped screwdriver, loosen four captive bolts securing hinged sensor access door and open door.
3	Using No. 1 Phillips screwdriver, loosen two retaining screws on DB-9 connector located on top of fiberoptic module. Remove DB-9 connector.
4	Install signal cable on fiberoptic module DB-9 connector. Using No. 1 Phillips screwdriver, tighten two retaining screws.
5	Using small flat-tipped screwdriver, remove four screws securing fiberoptic module to mounting plate.

Table 11.5.9. Fiberoptic Module Removal and Installation -CONT

Step	Procedure
INSTALLATION	
Tools and Materials Required: Flat-tipped screwdriver Small flat-tipped screwdriver No. 1 Phillips screwdriver	
<p style="text-align: center;"><u>WARNING</u></p> <p>Death or severe injury may result if power is not removed from sensor prior to maintenance activities. Ensure that circuit breakers (located in DCP) supplying power to sensor are set to off (right) position.</p>	
2	With DB-9 connector toward the front (RECEIVE) and using small flat-tipped screwdriver, install four screws to secure fiberoptic module to mounting plate.
3	Remove plastic covers from fiberoptic connectors and connect transmit (TX) cable to TRANSMIT connector and receive (RX) cable to RECEIVE connector.
4	Remove two fiberoptic cables from underneath fiberoptic module by turning ccw. Install protective plastic covers over fiberoptic connectors.
5	Using large flat-tipped screwdriver, close and secure freezing rain sensor access door.
6	Set circuit breakers on freezing rain sensor circuit breaker module inside DCP equipment cabinet to on (left) position.